

WHAT IS CLAIMED IS:

SUB A1 1. A substrate cutting method characterized by irradiating a substrate with ultrashort pulse laser to cut it.

2. A substrate cutting method as set forth in Claim 1, characterized in that the pulse width of said ultrashort pulse laser is not more than 1 picosecond.

SUB A2 3. A substrate cutting method as set forth in Claim 1 or 2, characterized in that the surface layer of the substrate which is in an improved state is irradiated with said laser.

4. The method for cutting a substrate according to Claim 1, wherein

the ultra short pulse laser emits a plurality of pulses having an interpulse separation of 3 to 30 picoseconds.

131 5. The method for cutting a substrate according to Claim 2, wherein

the ultra short pulse laser emits a plurality of pulses having an interpulse separation of 3 to 30 picoseconds.

6. The method for cutting a substrate according to Claim 3, wherein

the ultra short pulse laser emits a plurality of pulses having an interpulse separation of 3 to 30 picoseconds.

7. A substrate cutting method as set forth in Claim 1, characterized in that said substrate is a semiconductor wafer formed with a number of elements and said ultrashort pulse laser is irradiated along the scribed lines between said elements.

8. A substrate cutting method as set forth in Claim 2, characterized in that said substrate is a semiconductor wafer

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formed with a number of elements and said ultrashort pulse laser is irradiated along the scribed lines between said elements.

9. A substrate cutting method as set forth in Claim 3, characterized in that said substrate is a semiconductor wafer formed with a number of elements and said ultrashort pulse laser is irradiated along the scribed lines between said elements.

10. A substrate cutting method as set forth in Claim 4 or 5, characterized in that said substrate is a semiconductor wafer formed with a number of elements and said ultrashort pulse laser is irradiated along the scribed lines between said elements.

SUB A3
11. A substrate cutting method as set forth in Claim 10, characterized in that the thickness of said semiconductor wafer is not more than 50 μm .

12. A substrate cutting method as set forth in Claim 10, characterized in that said semiconductor wafer has a batch-processed adhesive agent layer on the back.

13. A substrate cutting method as set forth in Claim 11, characterized in that said semiconductor wafer has a batch-processed adhesive agent layer on the back.

14. A substrate cutting method as set forth in Claim 10, characterized in that the back of said semiconductor wafer is drawn by an x-y table.

15. A substrate cutting method as set forth in Claim 11, characterized in that the back of said semiconductor wafer is drawn by an x-y table.

16. A substrate cutting method as set forth in Claim 13, characterized in that the back of said semiconductor wafer is

drawn by an x-y table.

17. A substrate cutting method as set forth in Claim 10, characterized in that said laser is irradiated to the semiconductor wafer excluding the peripheral portion thereof.

18. A substrate cutting method as set forth in Claim 11, characterized in that said laser is irradiated to the semiconductor wafer excluding the peripheral portion thereof.

19. A substrate cutting method as set forth in Claim 13, characterized in that said laser is irradiated to the semiconductor wafer excluding the peripheral portion thereof.

20. A substrate cutting method as set forth in Claim 16, characterized in that said laser is irradiated to the semiconductor wafer excluding the peripheral portion thereof.

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